program code for selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

program code for buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

29. (Added) The apparatus of claim 1, wherein the each time-based queue dequeues its entire contents at its separate time for dequeuing.

30. (Added) An apparatus for controlling data flow through a network, the apparatus comprising:

means for determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

means for selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

means for buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

REMARKS

Claims 1-30 are pending in the application. Claims 28-30 have been added. Favorable reconsideration of the application, as amended, is respectfully requested.

I. REJECTIONS OF CLAIMS 1-8, 10-19, AND 21-27 UNDER 35 U.S.C. § 102(b)

Claims 1-8, 10-19, and 21-27 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,317,562 ("Nardin"). These claims are believed to be allowable for at least the following reasons set forth below. Withdrawal of the rejection is respectfully requested.

The present invention defined in the claims relates to apparatus/methods for controlling data flow through a network using a plurality of time-based queues. Specifically, claims 1, 12, 15, and 25 recite that "each time-based queue is **set to dequeue** its contents **at a separate time**."

See, for example, page 2, line 21 - page 3, line 2; and page 5, line 24 - page 6, line 10 of the present specification.

By contrast, Nardin fails to teach or suggest the above-identified feature recited in claims 1, 12, 15, and 25. The Examiner asserts that Nardin discloses this feature of the invention at column 2, lines 30-36. Contrary to the Examiner's assertion, this portion of Nardin only refers to user configurable delays in general, with no suggestion that the user configurable delays are associated with specific queues. As described at column 12, lines 10-15, the user configurable delay in Nardin is used to validate routes for a given class of service, not for setting a specific dequeuing time.

Nardin uses four FIFOs 212, 214, 216, and 218 to store input cells categorized into four types of data based on its data attributes (e.g., priority). See, column 6, line 48 - column 7, line 20. Nothing in Nardin suggests that the FIFOs are capable of **setting each time-based queue** to be **dequeued at a separate time** because a FIFO outputs its contents only in an sequential order in which it receives the contents. Aside from FIFOs 212, 214, 216, and 218, Nardin presents no other buffers or queues. Therefore, claims 1, 12, 15, and 25 cannot be said to be anticipated by Nardin. Withdrawal of the rejection is respectfully requested.

Claims 2-8, 10, 11, 13, 14, 16-19, 21-24, 26, and 27 dependent directly or indirectly from claims 1, 12, 15, and 25 are also believed to be allowable for at least the reasons set forth above in connection with claims 1, 12, 15, and 25. Withdrawal of the rejection is respectfully requested.

II. REJECTIONS OF CLAIMS 9 AND 20 UNDER 35 U.S.C. § 103

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Nardin in view of U.S. Patent No. 6,247,061 ("Douceur"). Claim 20 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Nardin in view of U.S. Patent No. 6,259,699 ("Opalka"). Neither Douceur nor Opalka cures the deficiencies of Nardin. Specifically, neither reference suggests a plurality of time-based queues that are each set to dequeue its contents at a separate time. Since claims 9 and 20 are dependent, either directly or indirectly, from claims 1 and 15, respectively, these claims are believed to be allowable for at least the reasons set forth in connection with claims 1 and 15. Withdrawal of the rejection is respectfully requested.

III. NEW CLAIMS 28-30

Claims 28-30 have been added to further clarify the distinction between the present invention and Nardin. Claim 28 recites that "each time-based queue is set to dequeue its contents at a separate time associated with its increment of time," which is recited in claim 1. Claim 29 is dependent from claim 1. Claim 30 is an apparatus claim which corresponds to claim

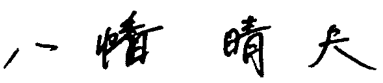
15. As such, claims 28-30 are believed to be allowable for at least the reasons set forth in connection with claims 1 and 15.

Furthermore, claim 29 recites that the "each time-based queue dequeues its entire contents at its separate time for dequeuing." Nardin uses a fixed-length cell having, e.g., 24 bytes (column 7, lines 52-54), and network trunk card 182 which queues fixed-length cells (column 5, lines 19-21). As a result, Nardin's system is not capable of **dequeuing entire contents** of a time-based queue **at its separate time** for dequeuing. Therefore, Nardin fails to teach or suggest the features recited in claim 29. Claim 29 is believed to be allowable in this regard, too.

IV. CONCLUSION

Applicants believe that all pending claims are in condition for allowance, and respectfully requests a Notice of Allowance at an early date. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 510-843-6200.

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP



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Limited Recognition under 37 CFR §10.9(b)

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APPENDIX -- VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 28-30 have been added as follows:

28. (Added) A computer program product comprising a machine readable medium on which is provided program instructions for controlling data flow through a network, the program instructions comprising:

program code for determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

program code for selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

program code for buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

29. (Added) The apparatus of claim 1, wherein the each time-based queue dequeues its entire contents at its separate time for dequeuing.

30. (Added) An apparatus for controlling data flow through a network, the apparatus comprising:

means for determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

means for selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

means for buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

APPENDIX – CLEAN VERSION OF PENDING CLAIMS

1. An apparatus for controlling data flow through a network, the apparatus comprising:

one or more processors;

memory coupled to at least one of the one or more processors; and

a plurality of time-based queues logically configured on the memory and together defining a period of time with each time-based queue defining a separate increment of time within the period of time, whereby each time-based queue is set to dequeue its contents at a separate time,

wherein the processor is configured or designed to direct (i) data or (ii) grants to transmit data to particular time-based queues based upon network traffic shaping delays prescribed for the data or grants to transmit the data.

2. The apparatus of claim 1, wherein the apparatus is a router.

3. The apparatus of claim 1, wherein the apparatus is a cable modem termination system.

4. The apparatus of claim 1, wherein the separate increments of time defined by the time-based queues are each of the same length.

5. The apparatus of claim 1, wherein the separate increments of time defined by the time-based queues are configurable.

6. The apparatus of claim 1, wherein the period of time defined by the plurality of time-based queues are configurable.

7. The apparatus of claim 1, wherein the one or more processors are further configured or designed to determine network traffic shaping delay.

8. The apparatus of claim 1, wherein the one or more processors are further configured or designed to discard data or a request to grant transmission of data if a network traffic shaping delay is greater than the period of time defined by the plurality of time-based queues.

9. The apparatus of claim 1, wherein the one or more processors are further configured or designed to transmit, without buffering in a time-based queue, the data or issue grants to transmit data if there is no network traffic shaping delay.

10. The apparatus of claim 1, wherein the one or more processors are further configured or designed to direct network packets of varying sizes to the time-based queues.

11. The apparatus of claim 1, wherein the apparatus is configured or designed to simultaneously buffer, in a single time-based queue, data or grants to transmit data from a plurality of network nodes.

12. An apparatus for controlling data flow through a network, the apparatus comprising:

traffic shaping means for determining how long to buffer data or grants to transmit data; and

buffering means for buffering the data or grants to transmit data in a plurality of time-based queues together defining a period of time, with each time-based queue defining a separate increment of time within the period of time, whereby each time-based queue is set to dequeue its contents at a separate time.

13. The apparatus of claim 12, wherein the traffic shaping means also directs the data or grant to transmit data to particular time-based queues based upon a determined length of time for buffering.

14. The apparatus of claim 12, further comprising a policing means for determining whether to buffer the data or grants to transmit data.

15. A method of controlling data flow through a network, the method comprising:

determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

16. The method of claim 15, further comprising receiving data addressed to the network node prior to determining that transmitting additional data will or will likely exceed the maximum allowed data flow, and wherein the data addressed to the network node is the additional data.

17. The method of claim 15, further comprising receiving data sent by the network node prior to determining that transmitting the additional data will or will likely exceed the maximum allowed data flow, and wherein the data sent by the network node is the additional data.

18. The method of claim 15, further comprising calculating a network capacity used by the network node if the additional data was to be transmitted, the calculation being performed prior to determining that transmitting the additional data will or will likely exceed the maximum allowed data flow.

19. The method of claim15, further comprising determining a delay until the additional data can be transmitted, wherein the determined delay is used to select the time-based queue.

20. The method of claim 19, wherein the time-based queue is selected by matching its time to dequeue with the delay determined for the additional data.

21. The method of claim 15, further comprising:

dequeuing the additional data; and

transmitting the additional data without exceeding the maximum allowed data flow for the network.

22. The method of claim 15, further comprising:

receiving new data that does not form part of the additional data;

determining that transmitting the new data will or will likely exceed the maximum allowed data flow;

determining a delay until the new data can be transmitted without exceeding the maximum allowed data flow for the network node; and

determining that the delay is sufficiently long that the new data is discarded without buffering in the time-based queues.

23. The method of claim 15, wherein the separate increments of time defined by the time-based queues are each of the same size.

24. The method of claim 15, wherein the increments of time defined by the time-based queues are configurable, and wherein the period of time defined by the plurality of time-based queues is configurable.

25. A computer program product comprising a machine-readable medium on which are stored program instructions for controlling data flow through a network, the program instructions comprising:

determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

26. The computer program product of claim 25, further comprising program instructions for calculating a network capacity used by the network node if the additional data was to be transmitted, the calculation being performed prior to determining that transmitting the additional data will or will likely exceed the maximum allowed data flow.

27. The computer program product of claim 25, further comprising program instructions for:

receiving new data that does not form part of the additional data;

determining that transmitting the new data will or will likely exceed the maximum allowed data flow;

determining a delay until the new data can be transmitted without exceeding the maximum allowed data flow for the network node; and

determining that the delay is sufficiently long that the new data is discarded without buffering in the time-based queues.

28. (Added) A computer program product comprising a machine readable medium on which is provided program instructions for controlling data flow through a network, the program instructions comprising:

program code for determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

program code for selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

program code for buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

29. (Added) The apparatus of claim 1, wherein the each time-based queue dequeues its entire contents at its separate time for dequeuing.

30. (Added) An apparatus for controlling data flow through a network, the apparatus comprising:

means for determining that transmitting additional data to or from a network node will or will likely exceed a maximum allowed data flow for the network node;

means for selecting one of a plurality of time-based queues that together define a period of time, with each time-based queue defining a separate increment of time within the time period, whereby each time-based queue is set to dequeue its contents at a separate time associated with its increment of time; and

means for buffering the additional data or a grant to transmit the additional data in the selected one of the plurality of time-based queues.

BEFORE THE OFFICE OF ENROLLMENT AND DISCIPLINE
UNITED STATES PATENT AND TRADEMARK OFFICE

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Expires: December 4, 2002

Harry I. Moatz
Director of Enrollment and Discipline